Note on the Total Solar Eclipse of 1889, *January* 1.
By J. R. Hind, LL.D., F.R.S.

The belt of totality in the solar eclipse on January 1 next traverses California, where at that season favourable atmospheric conditions for observation may be anticipated with some degree of confidence.

The central line meets the American coast at Point Arena, traversing the State of California in the direction of Pilot Peak, which is also close upon the central eclipse. At Point Arena totality commences at $1^h 30^m 33^s$ local mean time, or at $1^h 45^m 13^s$ Pacific standard time, and continues $2^m 3^s$ according to the elements of the *Nautical Almanac*, the Sun at an altitude of 25°. At Pilot Peak totality commences at $1^h 45^m 54^s$ local mean time, or at $1^h 49^m 46^s$ Pacific standard time, and continues $1^m 57^s$, with the Sun at an altitude of 23°. Between these points the central eclipse crosses the track of the Central Pacific Railroad, or rather branches of that line, north of Colusa. Probably any observers proceeding from Europe for the observation of this phenomenon will not care to locate themselves east of the Sierra Nevada, the duration of totality of course diminishing with decreasing westerly longitude, and the Sun's altitude also becoming less, so that in 105° 29′ W. and 46° 39′ N., close on the central line, the total eclipse begins at $3^h 4^m 14^s$ local mean time, and continues $1^m 25^s$, with the Sun at an altitude of only 9°. The main line of the Central Pacific appears to be again crossed near Oreana.

At Mendocino totality commences at $1^h 29^m 47^s$ local mean time, and continues $1^m 45^s$. At San Francisco and its suburbs Alameda, Oakland, and Berkeley (the seat of the University of California, now presided over by our associate Prof. Holden), the eclipse, though very large, will not be total. At San Francisco the magnitude is 0·987, and it is to be regretted that the Lick Observatory on Mount Hamilton is not within the shadow; the greatest eclipse occurs there at $1^h 45^m$ local mean time, magnitude 0·974.

For any place near Point Arena the *Greenwich* mean time (t) of beginning and ending of totality may be found from the following expressions :—

$$\cos \omega = +125\text{·}9912 - [2\text{·}14556] \sin l + [1\text{·}75929] \cos l . \cos (\lambda + 334° \; 32′\text{·}6)$$

$$t = 8^h 54^m 7^s\text{·}6 \mp [1\text{·}78807] \sin \omega + [2\text{·}72053] \sin l$$
$$- [3\text{·}96675] \cos l \cos (\lambda + 236° \; 27′\text{·}3)$$

where l is the *geocentric* latitude of the place, λ the longitude west of Greenwich, taken *negatively*, and the quantities within the square brackets are logarithms.

The track of the central eclipse between 9ʰ 45ᵐ and 10ʰ 0ᵐ Greenwich mean time is as follows :—

Greenwich M.T.	Long. W.	Lat. N.	Duration of Totality on Central Line	Sun's Altitude
h m	° ′	° ′	m s	°
9 45·0	124 21·7	38 44·6	2 4·1	25·5
9 47·5	122 56·4	39 11·7	2 1·3	24·5
9 50·0	121 25·9	39 42·5	1 58·1	23·3
9 52·5	119 49·3	40 17·7	1 54·6	22·0
9 55·0	118 4·8	40 58·3	1 50·9	20·6
9 57·5	116 9·7	41 45·6	1 46·9	19·0
10 0·0	114 0·5	42 41·2	1 42·7	17·1

The Opposition of Sappho (80) *in* 1888.
By Robert Bryant, B.A., B.Sc.

This planet comes into opposition in longitude about 1888, April 12. The usual opportunity will then be afforded for obtaining the observations requisite for the correction of the elements of the planet's orbit. And that these observations should be made seems highly desirable for two reasons. Firstly, the observations of this planet between the years 1872 and 1882 were very few, so that this somewhat long neglect of the planet strengthens its claim for re-observation; and secondly, in August and September 1889 the planet makes one of those near approaches to the Earth which, on account of the eccentricity of its orbit and the near commensurability of its period with that of the Earth, occur every seven years.

For this purpose the following ephemeris for Greenwich midnight has been prepared, to which is added a suitable list of comparison stars, of which observers are requested to make use.

Observers using the transit instrument for observation of the planet may also be able to observe the corresponding comparison star.

δ in Longitude, 1888, April 11·7.

Magnitude 11.

Greenwich. Midnight. 1888.	Right Ascension.	Declination.	Log Δ.	Aberration.	Comp. Star.
	h m s	° ′ ″		m s	
Mar. 27	13 34 19·00	−14 26 34·7	0·23956	14 24	21
28	33 30·18	−14 19 51·0			20
29	32 40·47	−14 12 58·3	0·23677	14 19	20
30	31 49·93	−14 5 56·5			19
31	30 58·61	−13 58 45·9	0·23425	14 14	19
April 1	30 6·57	−13 51 26·9			18